

Work Order ID 126043

126043

Page 1

Friday, October 24, 2014 3:59:33 PM

Item ID: D350-748-241TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Turning Detail

Start Date: 10/24/14 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 10/24/14 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: MLS Date: 14-10-27 Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D350-748-241	G

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA647
2-Turn first side as per Folio FA647
3- File transition lines smooth
FOLIO REV: AA
DWG REV: 6

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

mmL
14/11/25

mmL
14/11/27

Pro

DQA:

Date: 15/03/19

QA Closed: ~~REM~~

Date: 15/03/19

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only ☐

Work Order: <u>126043</u> Part No. <u>D350-748-241TRN</u> NCR No. <u>15-4657</u>	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☒ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Crosstube ☒ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design	14/12/5	100	1	WALL THICKNESS MEASUREMENT IS OUT OF TOLERANCE. MIN WALL = 0.128 NOM. WALL = 0.147 (DWG) Δ 0.019	DAS 12 9-89 14/12/5	Acceptable. Min wall is within 0.020 of dwg nominal.	DAS 12 9-89 14/12/5	BC 14/12/09	JW 14-12-09 DAS 47 1-89 PD 15-02-17
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☒ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge	☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Page 2

Item ID: D350-748-241TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 10/24/14 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 10/24/14 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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120

120

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

1-Turn second side as per Folio FA647
2- File transition lines smooth.
3-Scribe part # as per Dwg D350-748-241
FOLIO REV: 17
DWG REV: 6

0.00

0.00

130

130

QC

Quality Control

QC1- Inspect dimensions to dimension sheet

Memo

0.00

0.00

140

140

QC

Quality Control

QC8- Inspect parts - second check

Memo

0.00

0.00

mark
14/11/27mark
14/11/28

14-12-09

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Crosstube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
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Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Page 3

Item ID: D350-748-241TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 10/24/14 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 10/24/14 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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150

0.00

150

Large Fab

Crosstubes

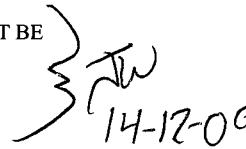
Memo

0.00

Crosstubes

1-DRILL HOLES FOR HEAT TREAT USING DT9806(HOLES MUST BE
ALIGNED ON SAME LINE ON BOTH CUFFS)

2-Grind machining marks



160

Outsource process - Heat Treat

0.00

160

Outsource1

Memo

0.00

Outsource process - Heat Treat

Issue P/O: 26689
Heat Treat to min 180 KSI As per Dwg D350-748-241

***Check for straighten and ensure parts are straight within 1/8" as per dwg ***

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached and Metlab process spec form

CL 14/12/230

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐															
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐															
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Large Fab ☐	Composite ☐	Supplier ☐																

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector.
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence
		☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge
		☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other

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Item ID: D350-748-241TRN Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Turning Detail
 Start Date: 10/24/14 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/24/14 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
170	Receive & Inspect for Damage & Mat'l Certs	0.00							
170									
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformaty is attached								
180	QC6- Inspect dimensions to drawing	0.00	Side A	φ	Side B				
180									
QC	Memo	0.00	27.58	2.309	2.148				
Quality Control	43 hrs 124.930" L								
190	Packaging	0.00							
190									
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack								
	Location: <u>LB</u>								

1X 2015-02-13

① 15-02-17 DAS 9 9-89

15-02-18

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐															
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐															
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 126043

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126043

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Item ID: D350-748-241TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Item Name: Crosstube Turning Detail

Stop *NS2*

Start Date: 10/24/14 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 10/24/14 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

200

QC21- Final Inspection - Work Order Release

0.00

2000

QC

Memo

0.00

Quality Control

15/2/18

DQA: _____ Date: _____

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐															
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FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Picklist Print

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Work Order ID: 126043

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Parent Item: D350-748-241TRN

D350-748-241TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 10/24/14

Required Date: 10/24/14

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
IPP Rev B Removed polish 08.04.02 EC verified by : DD
IPP Rev C Removed LPS-3 08.06.23 Ec verified by: DD IPP Rev D
11.02.24 as per dwg rev.F DD verf: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6015-125		Manufactured	No			120	Each	85.0000	1	1			

D6015-125

Crosstube Material

**

Location	Loc Qty	Loc Code
HALL	85	
113255	78	
95226	7	

Shane 10/21/20

DQA: _____ Date: _____



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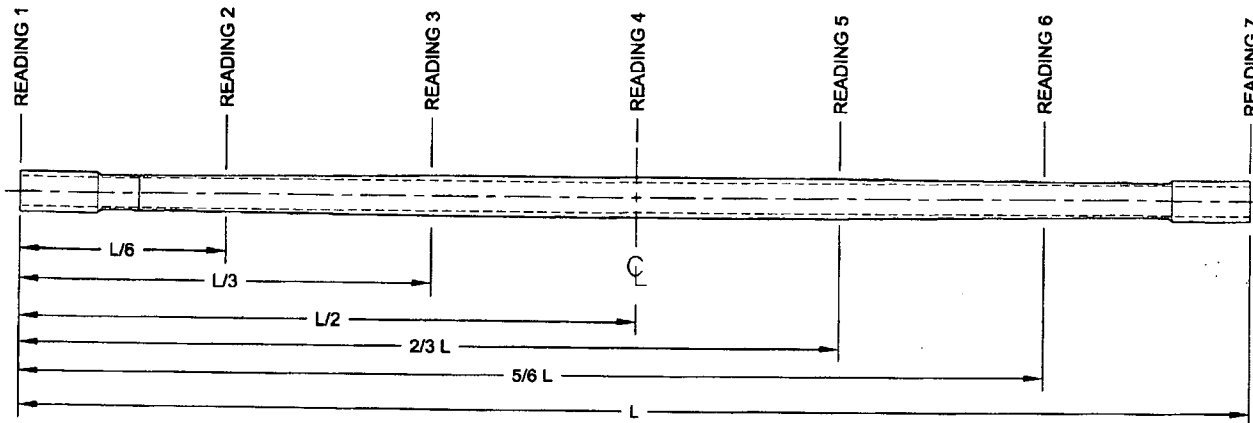
DART AEROSPACE LTD		Work Order:	126043
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number:	D350-748-241
Inspection Dwg: D350-748-241 Rev: G		Page 1 of 2	

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.243	✓		vern	CNC-08
	2.180	+0.005/-0.000	2.184	✓		↓	
	2.180	+0.005/-0.000	2.183	✓			
	2.208	+0.005/-0.000	2.212	✓			
	2.234	+0.005/-0.000	2.238	✓			
	2.253	+0.005/-0.000	2.256	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.303	✓			
	0.063	+/-0.010	.063	✓		vern	CNC-08
	5.25	+/-0.060	5.26	✓		II	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		II	
SIDE B	2.240	+0.005/-0.000	2.243	✓		vern	CNC-08
	2.180	+0.005/-0.000	2.184	✓		↓	
	2.180	+0.005/-0.000	2.183	✓			
	2.208	+0.005/-0.000	2.212	✓			
	2.234	+0.005/-0.000	2.238	✓			
	2.253	+0.005/-0.000	2.256	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.303	✓			
	0.063	+/-0.010	.063	✓		vern	CNC-08
	5.25	+/-0.060	5.26	✓		II	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		II	
	124.70	+/-0.060	124.700	✓		tape	LG-11

DART AEROSPACE LTD		Work Order:	126043
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number:	D350-748-241
Inspection Dwg: D350-748-241 Rev: G		Page 2 of 2	

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.114	.117	.122	.120	.008	0.030"
READING 2 L= 20	.107	.108	.104	.102	.006	
READING 3 L= 42	.128	.144	.162	.152	.034	
READING 4 L= 62	.142	.144	.149	.147	.007	
READING 5 L= 82	.131	.142	.158	.154	.027	
READING 6 L= 104	.109	.112	.106	.102	.010	
READING 7 L= 124	.117	.116	.117	.119	.003	

Dus A
 0.147 0.019

Calibration Result

Actual Block Thickness: .108 .100

Sitescan 250 Measured Thickness: .101 .100

Measured by:	<i>Amiric</i>
Date:	14/11/28

Audited by:	<i>JW</i> DAS
Date:	14/12-047

Preliminary Approval:	
Date:	

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	
B	12.02.02	Dwg Rev updated	KJ	
C	12.06.04	Wall thickness form added	KJ	
D	13.02.27	Dimension 5.25 was 4.26	KJ	
E	14.04.25	122.70 dimension revised to 124.70	KJ	<i>[Signature]</i>

Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D3595-063-395	RUBBER CUSHION
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-22 OR MS21920-21	CLAMP (PER DART SPEC. M-MS21920-21/-22)
8	1	MS27039-1-10	SCREW
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH AFTER TURNING = 124.70±0.06 (AFTER BENDING/TRIMMING = 122.70 REF)
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS2759/1E AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.

BENDING

- 12) ALL DIMENSIONS FOR BENT TUBE ARE POST STRESS RELIEF
- 13) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 8% BASED ON O.D. ON TOP HALF OF BEND, AND 7% ON BOTTOM HALF OF BEND.
- 14) MAX AMPLITUDE OF RIBBLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 15) AFTER BENDING, STRESS RELIEVE TUBE AT 650°F ±0.25°F FOR A MINIMUM OF 2 HRS AND ALLOW TO COOL TO AMBIENT TEMPERATURE (REF AMS2759/1E).
- 16) MAX TWIST AFTER STRESS RELIEF: WITH TUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 17) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 18) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. 126 043 MJS
14-10-23

RELEASE
2012-11-03

G	RMV ABRASION STRIP, SUPPORT NOW W/ PROSEAL & CUSHION, ADD STRESS RELIEF, LONGER CUFF, NOW TRIM'D AFTER BEND, ADD WALL DIMS & UPDATE TOL.	CP	12.09.12
F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C8-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	92		
DRAWN	92		
CHECKED	A.R.		
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	12.09.12		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. REV. G
D350-748-241 SHEET 1 OF 4
TITLE SCALE
CROSSTUBE (AS 350/355 HI AFT) NTS

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8 7 6 5 4 3 2 1

17 18
 D3502-1 SUPPORT
 MS21920-22 CLAMP (OR -21)
 D3595-063-395 RUBBER CUSHION
 2 PL



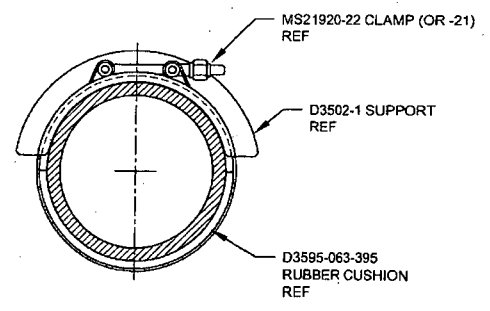
A7-2
 A
 A

14.37

D350-748-241
 BENT TUBE

INSTALL THIS SIDE ONLY, AFTER FINISH:
 AELS-1032-225 INSERT
 NAS1149D0363J WASHER
 MS27039-1-10 SCREW

**D350-748-241
 ASSEMBLY DETAIL**

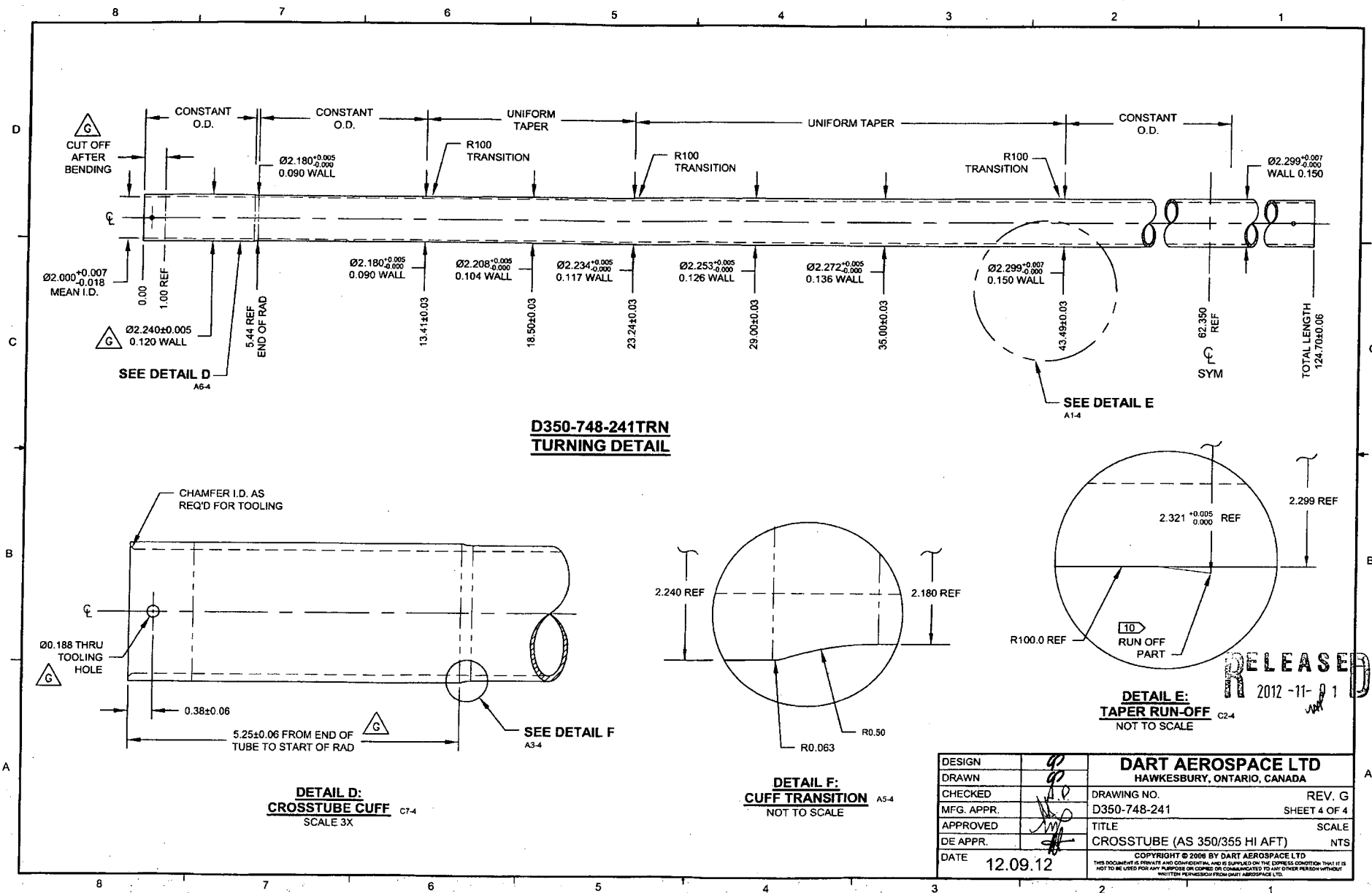


SECTION A-A D4-2
 SCALE 6X

RELEASED
 2012-11-01
 AW

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. G
MFG. APPR.		D350-748-241	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	12.09.12	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR REPRODUCED IN ANY MANNER WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

8 7 6 5 4 3 2 1





Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO26889**

Purchase Order Date 12/23/2014

PO Print Date 12/23/2014

Page Number 7 of 11

Order From :

VU-MET001

Ship To : DART AEROSPACE LTD

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038
USA

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone

215-233-2600

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

USD

FOB

FCA - (Free Carrier)

Ship To Contact

Ship To Phone

Ship Via:

Day & Ross collect

Ship Acct:

18	126043	D350-748-241TRN CROSSTUBE	1/23/2015	1.00	\$205.00	\$205.00
----	--------	------------------------------	-----------	------	----------	----------

Yes

1/23/2015

AS ABOVE

SP15-02-13

Line Total:

\$205.00

19	126044	D350-748-241TRN CROSSTUBE	1/23/2015	1.00	\$205.00	\$205.00
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Yes

1/23/2015

AS ABOVE

Line Total:

\$205.00

20	126045	D350-748-241TRN CROSSTUBE	1/23/2015	1.00	\$205.00	\$205.00
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Yes

1/23/2015

AS ABOVE

Line Total:

\$205.00

Note:

12/23/2014

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038

Packing List

Sales Order Number:

85923

Sales Order Date

Jan 8, 2015

Page:

1

Voice: 215-233-2600
Fax: 215-233-5653

Sold To:

DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7
CANADA

Ship To:

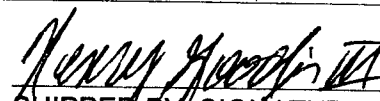
DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7
CANADA

Customer ID	PO Number	Payment Terms
DARA	PO26889	Net 30 Days
Ship Via	Process	
R & L CARRIERS	HT	

Quantity	Item	Description	Total Shipped	This Shipment
25.00		25 PCS. D350-748-141TRN CROSSTUBE HEAT TREAT TO MIN 180 KSI PER MIL-T-6736 OR AMS 2759-1C. SANDBLAST AFTER HEAT TREAT 1,100 POUNDS TOTAL		
1.00	CERT.			

SP15-02-13

COMMENTS


SHIPPED BY, SIGNATURE
METLAB

2/10/15
DATE

RECEIVED BY, SIGNATURE
DART AEROSPACE

DATE



1000 E. Mermaid La., Wyndmoor (Phila.) PA 19038-8093
Tel. (215) 233-2600 Fax (215) 233-5653

Certification

SOLD TO

Dart Aerospace
1270 Aberdeen Street
Haekesbury, ON K6A 1K7
Canada

February 10, 2015

Metlab Shop Order:	85923
Purchase Order:	PO26889
Description:	D350-748-141TRN, D350-748-241TRN
Quantity:	25 Pieces (13, 12)
Weight:	1,100 Pounds Total
Material:	4130 Alloy Steel
Specifications:	Harden and temper to 180 KSI minimum ultimate tensile strength per AMS 2759-1C

This is to certify that the above parts were processed as indicated above and conform to the specification requirements.

Results:

Ultimate Tensile Strength:	201/221 KSI*
Surface Hardness:	43/46 HRC

*Approximated from surface hardness


METLAB

Quality Representative Mark Jenkins

MERCURY CONTAMINATION: During the heat treating process, testing and inspections, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing device.mj



Heat Treating and Metallurgical Consulting